Table 26. Mating of Brown (6) to Landseer (8) in Newfoundlands

		Landseer parent gives BS^P or bS^P	
Brown parent gives	bS	$BbSS^P$ Black	$bbSS^P$ Brown
or	bS^P	BbS^PS^P Landseer	bbS^PS^P Brown/White

Colours should appear in equal proportions but this will only be true if large enough numbers are produced. The numbers apply regardless of which is the sire's colour and which the dam's.

The combinations that can occur are numerous and if you try it out with pencil and paper as shown in Table 26 you can predict the consequences. Some are quite limited, others can produce several possibilities but in the light of the colours produced the genotype of the dog becomes more certain and future predictions easier.

If you wish to avoid certain colour combinations then you have to understand coat colour inheritance in your breed. Some breeds are easier than others but predictions can be made quite readily given a knowledge of the bred and the pedigree. The same applies to other simple traits both desirable and undesirable.

With simple traits like does not necessarily beget like. From a Brown (5) and a Landseer (7) we can get nothing but Black (4), from two Blacks (4) we could get all four Newfoundland colours or, by chance, no Blacks at all.

Selecting for Polygenic Traits

Polygenic traits are usually features which show variation from one extreme to another along the lines of a normal curve (page 37). As breeders, we are trying to identify the best and breed from these. This emphasises the importance of recognising a good dog from a bad one but there is more to it than this. We can only make progress if:

1) we select outstanding animals to be the parents

2) the trait we are looking at is inherited.

Both 1 and 2 are essential if genetic progress is to occur.

The superiority of the parents is termed the *selection differential* and is the difference between the mean of the parents and the mean of the population from which they came. This is illustrated in the upper part of Figure 16.

The response in the next generation (R) will depend upon this S value and the heritability (h^2) of the characteristic being sought. In other words:

$$R = h^2 \times S$$